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WALL CABINET ASSEMBLY

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3 Field of the Invention

4 This invention relates generally to a wall cabinet
5 assembly constructed of injection molded plastic structural
6 panels. More specifically, the present invention relates to
7 a wall cabinet with a flipper door which is capable of being
8 packaged and shipped in a knocked-down state and constructed
9 into a secure wall cabinet at a desired site.

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11 Background Information

12 Throughout the home, a need exists to store a large
13 variety of different items. This is particularly true of
14 garage and utility areas where a vast array of products have
15 been developed to increase the comfort level of living. The
16 accumulation of these various objects and products gives rise
17 to a need for adequate storage of those items when not in
18 use.

19 Various cabinets for storing household items such as
20 gardening tools, automotive supplies, barbecue accessories
21 and the like are well known. One of the more popular types
22 of cabinets for storing household items is a wall cabinet
23 with a flipper door. Cabinets with flipper doors are
24 well-known in the prior art. Flipper doors are opened by

1 pulling the bottom of the door upward in a 90 degree arc such
2 that the door is parallel to the top wall of the cabinet.
3 The flipper door is then slid into the opening adjacent the
4 top wall such that the opening is completely exposed. The
5 movement of the flipper door is usually accomplished through
6 use of a rack and pinion assembly. Usually the rack is
7 located on the inside of the sidewalls of the cabinet, while
8 the pinion is connected to an axle or rod which is attached
9 to the door by brackets or hinges. Illustrative of such
10 cabinets with flipper door systems are U.S. Pat. No. 644,434
11 to Macey; U.S. Pat. No. 657,017 to Tobey; U.S. Pat. No.
12 726,411 to Knight; U.S. Pat. No. 726,957 to Macey; U.S. Pat.
13 No. 761,312 to Luellen; U.S. Pat. No. 1,288,665 to Page; U.S.
14 Pat. No. 3,339,995 to Bencene; U.S. Pat. No. 3,748,005 to
15 Chovanec et al; U.S. Pat. No. 3,794,401 to Dean et al; U.S.
16 Pat. No. 4,265,502 to Blodee et al; U.S. Pat. No. 4,375,907
17 to Vander Kooi et al; U.S. Pat. No. 4,600,254 to Whalen; and
18 U.S. Pat. No. 4,641,896 to Iimura et al.

19 Cabinets including drop doors and counterbalanced doors
20 are also well known in the art, and are often preferred over
21 other cabinets because the doors are less likely to produce
22 the guillotine effect which may be caused by heavier flipper
23 doors.

1 U.S. Pat. No. 2,258,948 to Garrison describes a bookcase
2 unit with a drop door which uses a rack and pinion system
3 similar to that used with a flipper door. However, instead
4 of the door swinging outward and being stored adjacent to the
5 top wall, the rack and pinion system is used to drop the door
6 vertically down past the bottom of the unit. The pinion is
7 attached to a rod which extends through loops in the hinges
8 located at the top of the door. A runway located on the
9 front inner sides of the bookcase contains a deep portion and
10 a shallow portion. The shallow portion contains the rack
11 which coacts with the pinion and allows the door to drop
12 smoothly. The deep portion is engaged by the end of the rod
13 which extends through the pinion. A spring is also provided
14 around the rod which assists to counteract the effects of
15 gravity and to achieve a more gradual dropping of the door.
16 This door style lacks the space saving feature of the flipper
17 door and tends to hinder access to lower cabinets or shelves.

18 U.S. Patent No. 6,557,958 to Motta et al. discloses a
19 storage bin with a counterbalanced door. The assembly
20 includes panels forming a bin or cabinet, and a flipper door
21 operably attached to the bin by a pair of opposing modules.
22 Each module includes a body forming a groove in the form of a
23 curvilinear track along its upper edge, and the door includes
24 a follower operably engaging the track. Each module further

1 includes a spring biased lever pivoted to the body of the
2 module at a mid-lever point. A first leg of the lever is
3 pivoted to the door at a door pivot point, and an oppositely
4 extending second leg is connected to a spring biased force
5 generating device. The arrangement is constructed to
6 counterbalance the door in most intermediate positions.

7 Cabinets including an over-the-top door are also well
8 known in the art and are often preferred over other cabinets
9 because the doors do not take up space within the cabinet
10 when opened. Such cabinets and doors often use a sliding
11 hinge arrangement, where a pair of hinges are attached to the
12 top and front of the cabinet and a track is attached to a
13 side of the door for both slidably and pivotally engaging the
14 hinge. The door opens by sliding the door upwardly and/or
15 outwardly until the door can be slid onto the top of the
16 cabinet for storage in an open position.

17 A problem is that these pivot/slide hinged doors can
18 close with guillotine-like motion if the doors are
19 prematurely released when partially open. This results in
20 the doors moving vertically downwardly by gravity with a
21 potentially unsafe speed and force unless proper care is
22 used. Some cabinet manufacturers have conceived of
23 alternatives to reduce the potential or likelihood of such
24 accidental downward movement of the doors. However, the

1 known alternatives are costly, include an unacceptable number
2 of components, are mechanically too complex, and/or are
3 difficult to assemble.

4 U.S. Pat. No. 4,615,570 to Goodman describes a cabinet
5 with a flipper door which is stored horizontally above the
6 top wall of the cabinet when in the open position. The
7 flipper door is operated by a rack and pinion assembly. The
8 rack is located on the upper inside wall of the cabinet and
9 includes a lower guide channel. The pinion gears are
10 rotatably coupled to each other by a transverse axle. The
11 terminal ends of the axle extend through the pinion gears and
12 slidably engage the lower guide channel. The flipper door of
13 the cabinet is larger than the cabinet opening in order to
14 cover the edges of the side walls when the door is closed.
15 The rack is also provided with an upper guide channel. A
16 link is attached between the transverse axle of the rack and
17 pinion assembly and the door hinges. The stud shaft which
18 secures the link to the hinge extends past the link to
19 slidably engage the upper guide channel and to create a pivot
20 axis which is shifted forward a sufficient amount to
21 accommodate the extra width of the flipper door. The
22 configuration of the door in this reference requires extra
23 space above the cabinet for the door which also prevents
24 stacking of the cabinets.

1 U.S. Patent No. 6,007,171, to Varellas-Olree discloses a
2 cabinet assembly with an over the top door. The assembly
3 includes a cabinet, a follower, and a mating guide. The
4 cabinet is configured with a front opening. The door is
5 configured to close the front opening. The sliding hinge
6 structures operably support the door on the cabinet for
7 pivotal and sliding movement between a closed position
8 covering the front opening, and an open position uncovering
9 the front opening and storing the door above the cabinet.
10 The follower and the mating guide are separate from the hinge
11 structures and operably attach an upper edge of the door to a
12 front edge of the cabinet. The follower and guide constrain
13 the door to a pivotal movement as the door is initially
14 opened to prevent a sliding guillotine-like movement when the
15 door opened.

16 Such prior art systems fail to meet all of the needs of
17 manufacturers to provide a product that can be easily
18 manufactured, packaged and shipped, or the needs of consumers
19 requiring structural integrity combined with modularity and
20 aesthetic appearance. Moreover, because these devices do not
21 break down they are difficult to ship from the manufacturer
22 to the consumer.

23 Paramount among such needs is a panel system which
24 creates cabinet walls which resist panel separation, buckling

1 and racking. Structure is a further consideration; the
2 cabinet formed by the panels must tie into the flipper door
3 and back panel in such a way as to unify the entire
4 enclosure. Also, from a versatility standpoint, a flipper
5 door should be present which can be easily opened and closed
6 after assembly of the side, top, bottom and back panels, and
7 which provides security and dependable pivoting access to the
8 contents of the wall cabinet without the guillotine-like
9 motion associated with the prior art.

10 There are also commercial considerations that must be
11 satisfied by any viable wall cabinet system or kit;
12 considerations which are not entirely satisfied by state of
13 the art products. The wall cabinet must be formed of
14 relatively few component parts that are inexpensive to
15 manufacture by conventional techniques. The wall cabinet
16 must also be capable of being packaged and shipped in a
17 knocked-down state.

18 In addition, there are ergonomic needs that a wall
19 cabinet system must satisfy in order to achieve acceptance by
20 the end user. The system must be easily and quickly
21 assembled using minimal hardware and requiring a minimal
22 number of tools. Further, the system must not require
23 excessive strength to assemble or include heavy component
24 parts. Moreover, the system must assemble together in such a

1 way so as not to detract from the internal storage volume of
2 the resulting wall cabinet or otherwise negatively affect the
3 utility of the wall cabinet.

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1 **Brief Description of the Invention**

2 The present invention provides an assembly, or kit, of
3 injection molded panels having integrated connectors which
4 combine to form a wall cabinet with a flipper door. The
5 panels are formed to interlock with one another without the
6 need for separate fasteners or connectors. The system
7 incorporates a minimum number of components to construct a
8 wall cabinet by integrally forming the connectors into the
9 injection molded panels. This minimizes the need for
10 separate connectors or fasteners to assemble the wall
11 cabinet. The integrated connection of the side wall, cover
12 and bottom panel components also simplifies the wall cabinet
13 construction. Injection molding allows the panels to be
14 formed with integral cross-bracing, ribs and gussets for
15 increased rigidity. When supplied as a kit, assembly of the
16 wall cabinet requires minimal hardware and a minimum number
17 of hand tools.

18 The left and right side wall panels are constructed with
19 outwardly extending contoured locking posts for interlocking
20 cooperative engagement with sockets in the ends of the like-
21 constructed top and bottom panels. The engagement between
22 the locking posts and the sockets serve to rigidly connect
23 the components together. The assembly includes a rear panel
24 which interlocks into grooves integrally formed into the

1 left, right, top and bottom panels to prevent the panel from
2 bowing inwardly or outwardly to provide security and
3 aesthetic appearance. The rear panel includes a plurality of
4 keyhole slots to allow the assembled cabinet to be easily and
5 securely attached to a wall. The interior of the wall
6 cabinet assembly includes two integrally molded tracks which
7 extend front to rear along the upper portion of each side
8 panel. Each track is constructed to accept D-shaped pin
9 members which define an axis of rotation and which extend
10 outwardly from each side of the upper portion of the flipper
11 door. The cooperation between the tracks and the D-shaped
12 pins only allow the flipper door to be rotated while it is in
13 its farthest forward position, and only allow the flipper
14 door to be slid into the cabinet while the door has been
15 rotated about the axis to an essentially horizontal position
16 such that the door is generally parallel to the top wall of
17 the cabinet. This construction allows the flipper door to be
18 secured across the opening of the cabinet while in the closed
19 position, and allows the flipper door to be slid into the
20 cabinet to an essentially juxtaposed position beneath the top
21 panel such that the opening is completely exposed.

22 Accordingly, it is an objective of the present invention
23 to provide a wall cabinet system having a flipper door which
24 operates via a novel hinge and slider track assembly.

1 It is a further objective of the present invention to
2 provide a guide device, by which a flipper door can be
3 smoothly guided inwardly into a cabinet body, and the flipper
4 door can be received sufficiently far into the cabinet body
5 to provide access to the interior of the cabinet.

6 Yet a further objective of the present invention is to
7 provide a wall cabinet system constructed from panels having
8 integrated connectors which accommodate injection molding
9 plastic formation of the panel components for increased
10 structural integrity.

11 Another objective of the present invention is to provide
12 a wall cabinet storage system in which the side walls, top
13 panel, and bottom panel are interlocked without the need for
14 separate fasteners.

15 Yet another objective of the present invention is to
16 provide a kit for a wall cabinet that is capable of being
17 packaged and shipped in a knocked-down state and constructed
18 into a secure cabinet.

19 Other objectives and advantages of the present invention
20 will become apparent from the following description taken in
21 conjunction with the accompanying drawings wherein are set
22 forth, by way of illustration and example, certain
23 embodiments of this invention. The drawings constitute a
24 part of this specification and include exemplary embodiments

1 of the present invention and illustrate various objects and
2 features thereof.

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1 BRIEF DESCRIPTION OF THE FIGURES

2 FIGURE 1 is a perspective view of the instant invention;

3 FIGURE 2 is an exploded view of the instant invention

4 illustrated with the flipper door omitted for clarity;

5 FIGURE 3 is a perspective view of the back of the
6 instant invention;

7 FIGURE 4 is a perspective view of the instant invention,
8 illustrated with the flipper door in the open position;

9 FIGURE 5 is a perspective view of the flipper door of
10 the instant invention;

11 FIGURE 6 is a perspective view of the inner surface of
12 the left side panel of the instant invention.

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1 Detailed Description of the Preferred Embodiments

2 While the present invention is susceptible of embodiment
3 in various forms, there is shown in the drawings and will
4 hereinafter be described a presently preferred embodiment
5 with the understanding that the present disclosure is to be
6 considered an exemplification of the invention and is not
7 intended to limit the invention to the specific embodiments
8 illustrated.

9 FIGS. 1-5 which are now referenced illustrate
10 perspective and exploded views of the wall cabinet assembly,
11 generally referenced as 10, according to a preferred
12 embodiment of the present invention. The wall cabinet
13 generally includes like-constructed top and bottom panels
14 100, left side panel 200, right side panel 300, rear panel
15 400 (FIG. 2), and flipper door panel 500. In the preferred
16 embodiment, the panels comprising the assembly are formed of,
17 but not limited to, a suitable polymeric material through the
18 process of injection molding. The result is that the panels
19 comprising the wall cabinet assembly 10 are formed as unitary
20 panels with integral connectors and cross bracing.
21 Strengthening ribs 102, 202 (FIG. 2) are integrally formed
22 within the inner and lower surfaces respectively of the side,
23 top, and bottom panels in order to enhance rigidity of the
24 panels while leaving the external surface in a generally

1 smooth condition for aesthetic purposes, as shown in FIG. 1.

2 The top and bottom panels 100 have an upper surface 104,

3 lower surface (not shown), front edge 106, rear edge 108, and

4 like-constructed left edge 112 and right edge 114. Adjacent

5 to each of the left and right edges 112, 114 is a means of

6 attaching the top and bottom panels to the left side panel

7 200 and right side panel 300, illustrated as a plurality of

8 formed sockets 116 extending inwardly from each end. The

9 formed sockets 116 are constructed and arranged to cooperate

10 with locking posts 210 extending outwardly along the inner

11 surfaces 204 of the left and right side panels 200, 300. The

12 locking posts 210 and sockets 116 are constructed and

13 arranged so that the locking posts 210 enter and mateably

14 engage the sockets 116 securing the panels together in an

15 inter-fitting perpendicular engagement. The upper and lower

16 surfaces 104 of the top and bottom panels 100 are also

17 constructed with a groove 118 extending from about the left

18 end 112 to about the right end 114 of the panels. The groove

19 118 is constructed and arranged to cooperate with the rear

20 panel 400. The cooperating engagement between the rear panel

21 400 and the grooves 118 increases the structural integrity of

22 the wall cabinet assembly 10 by preventing the rear panel 400

23 from bowing or bending inwardly or outwardly, and thus,

1 adversely affecting the appearance or operation of the wall
2 cabinet assembly 10.

3 The inner surfaces 204 of the left and right side wall
4 panels 200 and 300 are each configured having an upper
5 portion 208 and a lower portion 212. Both portions 208, 212
6 include an integrally formed attachment means illustrated
7 herein as outwardly extending locking posts 210. The locking
8 posts 210 are generally constructed and arranged to cooperate
9 with the sockets 116 provided in either end of the top and
10 bottom panels 100.

11 The outer surface of the panels 200, 300, 400, 500 and
12 the upper surface of the panels 100 are constructed generally
13 smooth and may be bowed inwardly for added strength and
14 aesthetic appearance. The inner surfaces of the panels 200
15 and 300 and the lower surfaces of the panels 100 are
16 constructed with a plurality of strengthening ribs 202 and
17 102, respectively, extending across the panels, and may
18 additionally be provided with a plurality of gussets (not
19 shown) to further strengthen the panels. The ribs and
20 gussets increase the structural integrity of the wall cabinet
21 assembly 10 by preventing the panels 100, 200, and 300 from
22 bowing or bending inwardly or outwardly, and thus, adversely
23 affecting the appearance or operation of the wall cabinet 10.
24 The integrally formed ribs 102, 202 and optional gussets are

1 facilitated by injection molding. Injection molding offers
2 significant strength and stability advantages over wood or
3 metal construction as utilized in the prior art. In this
4 manner, the enclosure of the instant invention is capable of
5 handling a significant amount of weight as compared to wooden
6 or sheet metal cabinets.

7 The left and right side panels 200, 300 are attached to
8 the top and bottom panels 100 by inserting the locking posts
9 210 into formed sockets 116 until the spring tabs 214
10 integrally formed into the locking posts 210 engage the
11 apertures 120 in the sockets 116 of the top and bottom panels
12 100. It will be appreciated that the purpose of the locking
13 posts 210 are to align two panels in a perpendicular
14 relationship and to facilitate their mechanical connection.
15 The perpendicular panels are brought into an overlapping
16 relationship wherein the locking posts 210 enter the
17 corresponding socket 116 in the top and bottom panels 100.
18 The result is a coupling engagement between the two panels.
19 The overlapping edges between the panels as described above
20 provide a secure connection and offer several advantages.
21 First, the design allows the panels to be connected without
22 the need for separate fasteners. Second, the design creates
23 a positive lock that prevents separation of the panels.
24 Third, the design maintains alignment of the panels in the

1 same plane and prevents bowing or bending of either panel
2 relative to one another. The resultant wall cabinet created
3 by the combination of the interlocking panels benefits from
4 high structural integrity and reliable operation.

5 Referring to FIGS. 2 and 3, the rear panel 400 is
6 attached to the top and bottom panels 100 by sliding the
7 upper and lower edges 402, 404 into the corresponding grooves
8 118 in the upper and lower surfaces of the top and bottom
9 panels 100. The grooves 118 in the top and bottom panels 100
10 correspond in shape and size to that of the upper and lower
11 rear panel edges to engage the rear panel 400. The result is
12 a positive mechanical connection between the rear panel 400
13 and the top and bottom panels 100.

14 Referring to FIGS. 3 and 6, the wall cabinet mounting
15 means is illustrated. The wall cabinet mounting means is
16 illustrated herein in a non-limiting embodiment as a
17 plurality of integrally formed keyhole slots 216. The
18 keyhole slots 216 depend inwardly from the rear portion of
19 the left side panel 200 and right side panel 300. The
20 keyhole slots are adapted to allow the wall cabinet to be
21 easily mounted and dismounted from a wall surface. In
22 operation, a minimum of two and preferably four fasteners are
23 locationally arranged and attached to a wall surface. The
24 wall cabinet keyhole slots 216 are thereafter slid over the

1 heads of the fasteners (not shown) and the wall cabinet is
2 slid downward a small amount. The cooperation between the
3 keyhole slots and the fasteners holds the wall cabinet
4 assembly 10 securely to the wall surface.

5 Referring to FIGS. 4 and 5, the flipper door 500 is
6 illustrated. The flipper door 500 is generally constructed
7 and arranged for enclosing the front of the wall cabinet 10.
8 The flipper door 500 includes an outer surface 502, an inner
9 surface 504, a top edge 506, a bottom edge 508, a left edge
10 510, and a right edge 512. The left edge 510 and the right
11 edge 512 each include a pivot means, illustrated herein as a
12 D-shaped pin member 514 which defines an axis of rotation and
13 extend outwardly from the upper portion thereof. The D-
14 shaped pin members are generally constructed and arranged to
15 cooperate with the left and right side panel tracks 218 (FIG.
16 6) to allow the lower edge 508 of the flipper door 500 to
17 rotate about the axis to an essentially horizontal position
18 when in a forward most position and thereafter slide inwardly
19 in a generally parallel and adjacent manner to the lower
20 surface of the top panel 100 along the track 218 and to an
21 essentially juxtaposed position beneath the top panel to
22 provide ingress into the wall cabinet. The flipper door 500
23 is also provided with a latch means for releasably securing
24 the flipper door in a lowered position across the wall

1 cabinet opening. The latch means is illustrated herein as a
2 spring-lock 516 integrally formed into the lower portion of
3 the left and right edges 510, 512 of the flipper door 500.
4 The spring-locks 516 are generally constructed and arranged
5 to cooperate with a catch plate 220 (FIG. 6) depending
6 inwardly from the front portion of the inner surfaces of the
7 left and right side panels 200, 300.

8 Referring to FIG. 6, the inner surface of the left side
9 panel 200 is shown, illustrating the like-constructed tracks
10 218 integrally formed into the inner surface of the left and
11 the right side panels 200, 300. The tracks 218 are
12 constructed as inwardly depending tracks having a generally
13 circular front portion 222 and a rearwardly extending upper
14 track portion 224 and lower track portion 226 terminating in
15 a rear stop portion 228. The lower track portion 226
16 extending rearwardly and about tangentially from the lower
17 quadrant of the circular portion 222, and the upper track
18 portion 224 extending rearwardly and generally parallel to
19 the lower track portion. The circular front portion 222 is
20 constructed and arranged to allow rotation of the cooperating
21 D-shaped pin 514, and the rearwardly extending track portions
22 224, 226 operably engage the cooperating D-shaped pin to
23 allow linear translation after upward rotation of the flipper
24 door 500. The flat side of the D-shaped pin 518 cooperates

1 with the upper track portion 224 and the radiused side of
2 said D-shaped pin 520 cooperates with the lower track portion
3 226 to prevent rotation of the flipper door 500 during its
4 linear translation.

5 Thus, a wall cabinet assembly with a flipper door
6 comprised of injection molded components having integrated
7 connectors which may be provided as a kit and assembled on a
8 desired site has been shown and described.

9 All patents and publications mentioned in this
10 specification are indicative of the levels of those skilled
11 in the art to which the invention pertains. All patents and
12 publications are herein incorporated by reference to the same
13 extent as if each individual publication was specifically and
14 individually indicated to be incorporated by reference.

15 It is to be understood that while a certain form of the
16 invention is illustrated, it is not to be limited to the
17 specific form or arrangement herein described and shown. It
18 will be apparent to those skilled in the art that various
19 changes may be made without departing from the scope of the
20 invention and the invention is not to be considered limited
21 to what is shown and described in the specification.

22 One skilled in the art will readily appreciate that the
23 present invention is well adapted to carry out the objectives
24 and obtain the ends and advantages mentioned, as well as

1 those inherent therein. The embodiments, methods, procedures
2 and techniques described herein are presently representative
3 of the preferred embodiments, are intended to be exemplary
4 and are not intended as limitations on the scope. Changes
5 therein and other uses will occur to those skilled in the art
6 which are encompassed within the spirit of the invention and
7 are defined by the scope of the appended claims. Although
8 the invention has been described in connection with specific
9 preferred embodiments, it should be understood that the
10 invention as claimed should not be unduly limited to such
11 specific embodiments. Indeed, various modifications of the
12 described modes for carrying out the invention which are
13 obvious to those skilled in the art are intended to be within
14 the scope of the following claims.

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